Vol. II. INDIANAPOLIS, Ia., SEPTEMBER 1, 1846. No. 17.

EDITED BY
HENRY WARD BEECHER, Indianapolis,
EDWARD J. HOOPER, Cincinnati, Ohio.

S. V. B. NOEL, *Publisher and Printer.*

WESTERN FARMER AND GARDENER.

INDIANAPOLIS, TUESDAY, SEPTEMBER 1, 1846.

HORTICULTURIST. — The second number of this periodical has failed to reach us. Will the publishers do us the favor to forward it?

NOTICE OF NEW WORKS.

Our readers would be benefitted by a monthly account of all new publications bearing on the subjects treated of in this journal. We should be glad to give them a cursory review of the book and periodical publications and shall endeavor to make arrangements therefor.

We send this number to several eastern publishers, with a view of directing their attention to this medium of bringing their works into notice. Books may be sent by publishers directed "Western Farmer and Gardener, care of Huxley & Co., Cincinnati," whence we can procure them; periodicals may be mailed for Indianapolis.

WHAT ONE MAN CAN DO FOR HIS COUNTY. — We had some knowledge that friend S. W. Parker, of Connersville was potent in getting votes, and quite victorious in a speech; but we are constrained to believe that his preeminent excellence lies in obtaining subscribers for the Farmer and Gardener. A few weeks ago we had scarcely a subscriber in Old Fayette. First came *fifty-three;* then a few more, and then more, until we now, through his efforts, send about eighty to that county. Could any public-spirited man do as much for his county or neighborhood with so little trouble? We are able to supply back numbers of the present volume to some 600 or 800, yet.

THE SEASON.—Our readers will scarcely thank us for informing them that the past summer has been extraordinarily hot. Very probably they entertained some such opinion before seeing it in print. But it may be interesting to know, that this season has been alike, probably, all over both hemispheres. Throughout the east, and in Canada, the heat has been intense and long continued. In England it has been equally remarkable, and brought forward their wheat harvest nearly a month in advance of the usual time. In France the same heat has characterized the summer. It is manifest, that the sun has been laying himself out to see what he could do and has favored the temperate zones with a few of the ardent caresses of which he is so prodigal in the torid zone.

THE WESTERN FARMER AND GARDENER'S ALMANAC, for 1847, has just been issued from this office.

HORTICULTURAL CHIT-CHAT.

We see, in our exchanges, much that will afford some interesting small-talk, and we propose a collection of items, not unprofitable, we hope.

Mr. Affleck, the accomplished editor of the Agricultural Department of the New Orleans Times, in a notice of the Farmer and Gardener, mentions some facts which we introduce to our readers.

In reference to our remarks upon the *Agave Americana*, he says: "In Mexico, where it is cultivated to a great extent for its sap, from which the Mexicans make their principal drink, called *Pulque*—made by simply fermenting the sap, which has been collected from a cup made on top of the flower-stalk, by cutting it off and scooping out the pith—matures and throws up a flower-stalk in seven years. It stands the exposure of our winters in the latitude of Washington, Miss., pretty well; though the late frosts, the past spring, nipped the ends of the leaves in young plants. There are magnificent specimens in this vicinity."

Cedar Berries.—One of our correspondents enquired how these were to be sown: Mr. A. says,

"When the seeds or berries of the cedar are gathered, pour boiling water on them; let it remain long enough to soften the pulp so that it can be entirely rubbed off. Pour boiling water again over the clean seeds and leave them to soak twelve hours; when, if they are sown in a light sandy loam, they will come up in three or four weeks. They must have the shade of a little branch over them the first summer—a slight shade only.

Referring to the article upon fruits by our correspondent, Mr. Gillett, he says:

"We should be glad if Mr. Gillett, and other nurserymen in Ohio, Indiana, etc., would let us know their price per hundred for two-year-old apple and pear trees, packed and shipped at some point on the Ohio or Mississippi? If western nurserymen would advertise in southern papers, stating what varieties of apples and pears they have, and their price per hundred, in lots of from one to five hundred, they would find it greatly to their interest. There is much anxiety felt through the entire south-west, to procure good trees, and many of us are planting large orchards, with the view of supplying the New Orleans market. The pear thrives admirably. Early apples are most wanted."

Our friend Dr. Plumer is thus noticed:

"We suspect that not even Dr. Plumer can make *aker* the popular way of spelling *acre*."

"Dr. P's journal of the weather and summers in Wayne county, Indiana, from 1832 to 1845, is interesting and valuable."

We do not know whether this orthography will be generally adopted or not; but if it should be, it would only be a return to the original way of spelling: for there is evidence that, previous to the time of Shakespear, it was commonly spelt *aker*. *Acre* is an innovation upon the original English spelling—an innovation, as Dr. P. has shewn, against rule and reason.

Glass Milk-pans are coming into use in England to a great extent. They are undoubtedly the best that can be employed. They are the least liable to contract uncleanliness, and being non-conductors of electricity, milk does not change during thunder-storms.

Fairly Beat.—We have seen accounts of pie-plant stalks exhibited at exhibitions in New York, weighing two pounds. We have a seedling of our own which has yielded petioles weighing twenty-six ounces; which we thought eminently respectable. But it seems that these are mere whip-stalks; for the Prairie Farmer, for August, acknowledges the receipt of two stalks from B. P. Cahoun, Southport, Wisconsan, weighing *forty-five ounces apiece!* The editor says the "Western Farmer and Gardener may try again." The Western Farmer and Gardener gives it up, for the present. Mr. Cahoun, we presume, cuts his pie-plant as he would any other tree, and hauls it home on an ox-sled, with a stout yoke of cattle, saws it into blocks, and then splits it up for use. The only way that we can think of to get off victoriously in this contest, is to assure Messrs. editors of the Prairie Farmer, that we raise esculent *vegetables*, and not *timber*, in our garden! But will Mr. Cahoun send us an account of the *kind*, where he obtained it, on what soil cultivated, and method of culture; if he will, he shall have the current volume of the Farmer and Gardener, in exchange for his trouble and as a token of our respect for a man that beats us, in such Bonaparte style.

Osage Orange.—The Magazine of Horticulture notices a tree of the *Maclura aurantiaca*, in the grounds of Messrs. Landreth and Fulton, Philadelphia, which, last year, *bore twenty-six bushels* of oranges. This is a beautiful tree, of the easiest culture, perfectly hardy, and much esteemed for making hedges. Mr. Hovey speaks in the same article of the Arbor vitæ as having been proved by some twelve years experience to be "superior to any other (tree) for forming hedges or screens."

Highest Mountain in the U. States.—The highest mountain east of the Mississippi in the U. States has been supposed to be Mount Washington, of the White Mountains. According to Professor Mitchel, the highest point of Black Mountain, North Carolina, is 6,476 feet higher than the level of the sea—being 200 feet higher than mount Washington. See p. 142, Alb. Cult., for August 1846.

Improved White Flint Wheat.—This is the name of a wheat raised and now widely diffused by Mr. Harmon of Wheatland, New York. We see in the (July) Cultivator, a statement that Mr. H. sold, last fall, over 1200 bushels of this wheat

for seed. The purchasers were from every part of the Union, but, of course, principally from his own neighborhood.

AMERICAN WHEAT IN GREAT BRITAIN.

The opening of British ports, by the abolition of the Corn Laws, will be of immense advantage to England; it will profit northern Europe; but will leave the United States, probably, a little worse that she was before, contrary to the impression of many farmers and operators. From the ports of the North Sea and the Baltic wheat may be had at an average of seventy-seven cents a bushel, and it may be freighted at thirteen cents, making it, in England, ninety cents. We cannot start it from New York at that price. It cannot be landed in England, upon an average, under 125 to 130 cents.

But, besides this comparison of prices, we are to calculate another element, to the full as important—the relative situation of the two competitors for the market, as to facilities for taking advantage of its fluctuations. The European operative receives immediate news of the state of the market, and can push forward his supplies within a week or ten days and before prices fall. It will require twelve or thirteen days to *bring us the news;* three weeks to a month to collect and put forward the grain; long before which, probably, the demand has been supplied from across the Channel.

Operators in produce who are not *near to a market* are always drawers in a lottery. He who must have six months intervening between the outlay of his capital and the time of sale, gives time enough for a dozen generations of caprices and revolutions to play upon his property. Speculators in flour, in pork, in beef, &c., are quite well acquainted with this fact.

While we gain no new advantage, by opening the English grain market, we lose some which we formerly had. While the Corn-laws were enforced, Great Britain gave her colonies the advantage of a low tariff upon the exportations. Thus Canada was allowed to enter flour at a lower rate than we could in Liverpool and London. The discrimination was enough to make the business profitable to Canadians, who, to carry on the commerce, bought first their own and then our wheat for manufacture, giving to the northern counties of our States a comparatively steady market. But now Canada is no longer a purchaser from us, since the British ports are no more favorable to her operations than to ours. The abolition of the corn-laws will benefit England and the Continent, and, with the exception perhaps of corn, will not materially advantage us.

CULTURE OF PIE-PLANT.

"Will our editor give some account of his mode of raising pie-plant? In doing it will he answer whether any sort can be forced into the extraordinary size of that exhibited from his garden; whether by planting seed, one can obtain as good a kind; wheteer the roots can be divided safely at any time except in the spring; and oblige an ardent lover of PIE."

"Our editor" will, with pleasure, put into this "PIE" all the ingredients of the information in his possession.

Beginners should in all cases, if possible, obtain a supply of plants, from a proved sort, by dividing the root. Raising from seed is an after, and an amateur-practice. The first object with every man is to supply his family with this esculent, and not to experiment with new sorts. Let him buy or beg from garden or nursery, enough buds to establish a bed, of some kind already known to be good.

The *best* season of the year for dividing the root is in the spring; the next best is in late autumn; and the worst, in mid-summer—as we have abundantly ascertained by experiment. The reason is plain. Like bulbs, and tubers, the root of the pie-plant stores up in itself during one season, a supply of organizable matter, enough to enable it to start off the next season, without any dependence upon the soil. Dahlias, potatoes, onions, turneps, cabbages, &c., it is well known, are able to grow for a considerable time, in the spring, without any connection with the soil; being sustained by that supply which they had treasured up within themselves the previous autumn. When this is exhausted, they will die, if they have not been put in connection with food from without. When pie-plant is divided in the spring, it is full of the material of life, and a bud cut off from the main root with a portion of the root attached, has a supply of food until new roots are emitted, which in good soil and weather will be in about a week. There is the same vitality in autumn, and the only reason why it is not so good for transplanting as spring, is the risk that the buds and roots will rot off during the winter. A uniform winter will scarcely injure one in a hundred, but constant changes, freezing and thawing, will weaken, if not destroy many of them. When, however, it is necessary to divide and transplant in the fall, cover the bed full four inches deep with coarse, strong, manure. Although great care will enable one to transplant a section of the root in mid-

summer, yet we have found that when no more attention is paid than in spring, nine plants are lost out of ten. The reason is obvious. There is no reserved treasure of sap in the root in summer, such as gives it vitality in spring or autumn. If for any reason we *must* take up a root in summer, let every possible fibre be saved, the plant well watered and sheltered until it begins to grow again.

Raising from Seed.—The origination of new varieties of fruits, flowers and esculent veffetables is one of the greatest rewards of gardening. Almost every seed of the pie-plant will produce a variety. We have thought ourselves repaid for trouble if one in fifty seedling plants were worth saving. It requires a full two years trial to approve a sort. Of fifty plants, say twenty-five may be rejected peremptorily the first season, the petioles being mere wires. Of the other twenty-five, one or two will give great promise, and the others will be doubtful. Let them be transplanted in the spring of the second season, into very mellow, rich, deep loam, full three feet apart every way, and here they may stand until the owner is fully satisfied, by the trial of one or more seasons, which are good and which, inferior. In marking seedling plants, the cultivator should bear in mind that there are *two* kinds required, viz: a very early sort, and one for the later and main supply. If a plant has small stalks, and is *late* too, reject it of course. If it be very *early*, it may be valuable even if quite small. Some sorts are fit for plucking five or six weeks before others; we have a variety which comes forward almost the moment the frost leaves the ground in the spring or in warm spells in winter.

In selecting a late sort from your seedlings, several qualities must be consulted. The plant should manifest an indisposition to go to seed; it should be apt to throw out an *abundance* of leaves, to supply those taken off; the petioles should be large; the meat rich and substantial. There is great difference between one sort and another in the amount of sugar required, in the delicacy of flavor, and in the property of stewing to a pulp, without wasting away.

A good variety of pie-plant, then, should be a vigorous grower, prolific, large in the stalk, not apt to flower, of a sprightly acid without any earthy or woody taste, not stewing away more than one-third when cooked, and not requiring too much sugar.

We have observed in our trials that seedlings having smooth leaves, with the upper surface varnished and glossy are seldom good; while every plant which we have thought worth keeping, had the upper surface of its leaves of a deep, dull, lack-lustre green.

Formation of a Bed.—Select a strong and rich loam. Let it be spaded full two feet deep. If the subsoil has never been worked, and is clay, or gravel, a large supply of old manure should be mixed with it. Our working-method is this: Mark off the square, begin on one side, lay out a full spadeful of the top soil clear across the bed; lay four or five inches of manure in the trench, and then spade it down a full twelve inches deep; beginning again by the side of the first trench, put the top-soil of the second into the first; add manure and spade as before; and so across the bed. The surface-soil thrown out of the first trench may be wheeled down and put into the *last* one. This process will leave the bed much higher than it was; let it stand one or two weeks to settle. If the bed is prepared in autumn it will be better, and in the spring it may be half spaded again before planting.

Mark out, by line, rows three feet apart, and set your plants in the rows three feet from plant to plant, if of the large kind, and two feet, if of the small. Very large varieties require four feet every way. The buds should be left just below the surface of the soil.

After Culture.—Through the summer keep the surface mellow and free from weeds. In the fall of the year, when the leaves show signs of falling, form a compost heap of fine charcoal if you can get it from blacksmith's or elsewhere, vegetable mold, ashes, and very old manure. Spread and spade in a good coat of this, spading lightly near to the plants and deeply between them. When frost destroys the tops wholly, cover the bed with coarse, strong manure about four inches deep, smooth it down, and let it remain thus. The next spring stir the surface smartly with a rake, and no further care will be required except to pluck out any weeds that grow through the summer.

Gathering.—Leaves are constantly springing from the centre. Of course the full grown ones will be on the out-side. These should be harvested, leaving the inside ones to mature. By going regularly over your bed, and taking in turn the outside leaves, a bed may be used till July without the slightest injury. Other fruit, after that time, usually displaces pie-plant and leaves it to rest the remainder of the year. The leaf-stalks should not be *cut* off. Slide the hand down as near as possible to the root, and give the stalk a backward and sideway wrench and it will be detached at a joint or articulation, and no stump will be left to

rot and injure the root. We usually cut off the leaves on the spot, leaving them about the root, both for shade to the ground and for manure.

THEORY OF MANURE.

Mr. Editor:—

"When Doctors disagree,
Disciples then are free."

I was exceedingly pleased with an article in your paper for July 1st, on "prepared manures, &c." The theory of that article, (sec. 2,) is interesting; *that plants thrive best on the decaying matter of their own species.* On turning to a discourse delivered before the Historical Society of Ohio, by Gen. Harrison, the farmer of Ohio, of log cabin memory, I find that he asserts the contrary.

"The preference of the soil for the first growth, ceases with its maturity. It admits of no succession, upon the principles of legitimacy. The long undisputed masters of the forest may be thinned by the lightning, the tempest, or by diseases peculiar to themselves; and whenever this is the case, one of the oft-rejected of another family, will find between its decaying roots, shelter and *appropriate food*; and springing into *vigorous growth*, will soon push its green foliage to the skies, through the decayed and withering limbs of its blasted and dying adversary, the soil itself, yielding it a *more liberal support* than to any scion from the *former occupant*."

The General seems to have *nature*, (in his reference to the forest trees) Analogy, (though animals may devour and live upon animals, yet it is not their own species,) and facts on his side, for the farmer knows that although corn-stalks may be left on the corn-field, and potato haulm on the potato-field, yet the fields will not yield their increase without a rotation of crops, or an addition of some foreign matter in the shape of manure.

Mr. Pell has told us that there are eleven substances necessary to the formation of plants, but he has not told us the proportion which is necessary of each.

If you will give us your opinion upon this subject, or throw out any other hints on manures, you will oblige those who live in the

BEECH FLATS.

It is very well known that a young orchard will not, usually, flourish on the site of an old one; for the older trees are supposed to have withdrawn from the soil certain elements necessary to their growth; and as necessary to the growth of the young tree, should it be planted there. There is no "like" or "dislike" of the soil to the tree; it is a plain case of starvation. The tree needs, and the soil cannot supply, certain elements of its wood.

But if, after a plant has abstracted from the soil certain ingredients, the whole plant is decomposed and returned to the earth, the soil repossesses itself of the lost elements, and is ready to yield them up again to a plant of the same kind. If the straw of wheat be burned upon the field, annually, the soil would yield fine crops for a thousand successive years, in so far as the *straw is concerned.* But if the grain is removed, and nothing resupplies the drain of phosphates which it makes from the soil, the soil will in due time, according to the original quantities in the soil, cease to yield *grain*, although the straw may be admirable. But if both straw and kernel were every year burned upon the field, as grass and its seed is upon the prairies, wheat would grow for a thousand years in succession. The same is true of corn, of potatoes, and of any annual crop. When the annual growth is restored to the soil, it is repossessed of all its treasure which had been loaned for a season. If a part of the crop is removed, the soil is poorer by just so much as the portion removed contained within it of the elements necessary to that crop, and it must be restored artificially, *i. e. by manuring*; or by allowing the earth to prepare (by disintegration or decomposition of its minerals,) a new supply; *i. e. by fallowing.* A forest will grow for ages on the same spot, for it returns annually its leaves, and, gradually, by force of accidents and the elements, its twigs, branches, trunks, &c., to the soil again. But let the whole product be gradually removed and the soil would soon be unable to supply the trees their nourishment, except in cases where the soil was very rich in the materials of growth. The forests of Germany, like our mines, are under the management of the Government. It was customary, for a time, to allow the peasants the use of the *twigs* and *smaller branches*; but analysis has shown that in these, especially, resides the large proportion of potash entering into the composition of trees; the annual removal of it debilitated the trees to an extent that obliged the Conservators to change their mode of proceeding.

On the other hand, in one of Mr. Horsford's letters from Germany, in the Cultivator, we have the question of growing plants upon their own ashes, brought, by the ablest chemist of the age, directly to the test of experiment.

"In the spring preceding my arrival in Giessen, Professor Leibig planted some grape scions under the windows of the laboratory. He fed them if I may use such an expression, upon the ashes of the grape vine,—or upon the proper inorganic food of the grape, as shown by analyses of its ashes. The growth has been enormous, and several of the vines bore large clusters of grapes in the course of the season. Indeed, I know not but all, as my attention was drawn to them particularly only since the fruit has been gathered. The soil otherwise is little better than a pavement—a kind of fine gravel, in which scarcely anything takes root.

I was shown pots of wheat, in different stages of their growth, that had been fed variously,—some upon the inorganic matters they needed, according

to the analyses of their ashes—others had merely shared the tribute of the general soil. The results in numbers I don't yet know. In appearance, no one could be at a loss to judge of what might be expected."

The fact that depopulated forest-grounds change the character of their growth, is quite familiar to all; and the reasons of it have been variously debated. We shall give, in our next, the views of Prof., (now Baron) Leibig, as the most satisfactory of any which have met our eye.

NEW SEEDLING STRAWBERRIES.

The facility with which new varieties of this delicious fruit may be originated will soon make it impossible to enumerate, much less to cultivate the varieties. Mr. Burr, of Ohio, has originated several esteemed new varieties. We perceive new names and descriptions in almost every paper received from the east. The August number of the Farmer's Cabinet contains a description of some forty kinds raised by Doctor Brinkle, of Philadelphia, and these are only a selection out of several hundred. The account is interesting to cultivators of this fruit, and we shall glean from it and from an account of Mr. Burr's seedlings, several facts for their consideration.

Of the variety marked 72, A, produced from a seed of a berry of Keen's Seedling crossed with the red Alpine, Dr. Brinkle says, "I know of no large-fruited strawberry, *with perfect anthers*, that will bear a full crop, except this, and its offspring, the *Cushing*."

Of the *Cushing* he says: "This plant was exhibited at the meetings of the Pennsylvania Horticultural Society, this summer, with twenty-six fine berries on it, several of them four and a quarter inches in circumference. Not long since, Mr. Longworth, offered one hundred dollars for a stawberry with perfect anthers, that will bear a full crop of fruit as large as Hovey's Seedling. Such a strawberry, I think, is the *Cushing*."

Nine varieties are represented to have shown fruit in *one year from the seed*.

Of No. 136, the Dr. says: "Some of my horticultural friends entertain the opinion that the Hautbois strawberry will not amalgamate with any other kind. A glance at No. 136 will satisfy them of the incorrectness of this opinion, for the structure of the leaf is essentially that of the Hautbois, from which it differs only in not being pointed."

The variety, *Abyssinian Prince*, was exhibited this summer with "upwards of sixty very large and magnificent berries" on one single plant. It is a cross of Keen's Seedling upon Hovey's Seedling.

If our memory serves us, Mr. Hovey has remarked in his Magazine, that no seedlings, worth cultivation, have ever been obtained by planting the seed of his celebrated seedling; and it is our impression that he states it in a way which implies that none could be. If we are correct in this, for we have not the leisure, at this moment, to hunt up the passage, Dr. Brinkle's seedlings will abundantly prove the contrary, since Hovey's seedling was the mother of some of his best kinds.

The *Abyssinian Prince* is one; and another, *Lizzie Randolph*, is said to have "proved to be very large, very fine, very productive; one plant having borne fifty-one berries."

Of the time required for testing a variety, Dr. B. says: "I had 254 kinds from seed planted last summer after strawberries were ripe. Of these 254 kinds, sixty-two blossomed this summer. Of the sixty-two kinds that blossomed in one year from the seed, forty-three fruited, and nineteen were sterile from imperfection of the pistillate organization. Of the forty-three that fruited, thirty had perfect anthers."

We subjoin a brief but clear account of his method:

"In the formation of new fruit of excellence, the most certain mode of proceeding is by artificial impregnation. By embracing the opportunity thus afforded, of selecting a fine paternal perent, the probability that the offspring will possess superior merit, is greatly increased. But where the whole operation is left to chance, the progeny may have an indifferent or worthless father, and consequently may inherit some of his bad qualities. To insure success and certainty, however, in the artificial process, much caution is required.

"Early in the morning select a blossom bud that is about to expand, separate the petals and destroy the male organs if they are present, by extracting every anther with the point of a penknife. The blossom is then to be inveloped in gauze, and tied securely so as to prevent the wind or insects from conveying pollen to the pistils. At mid-day or later, examine the blossoms of the kind with which you wish to cross it. If the anthers of this kind are found covered with a yellow powder which can be rubbed off on applying the finger, then the evidence is conclusive that the pollen is mature and fit for fecundating purposes. With your penknife extract one or more of these anthers, and take them to the blossom which had been covered with the gauze; removing the gauze, place the anthers on the pistils, and reapply the covering. If, in two or three days the petals do not drop off, or cannot readily be detached, fecundation has not taken place. But if the process has been successfully accomplished, the petals being no longer of use drop off, and the gauze may then be removed. So far, every source of error is avoided; and there can be no doubt as to the parentage of the new plants so formed. If, however, you apply pollen to a blossom that has already expanded, there is no certainty in your operation, because the wind or insects may have

anticipated you. Nor is the use of a brush or camel's hair pencil altogether free from objection, since it may retain pollen used in a previous experiment.

"Before closing these preliminary observations on artificial impregnation, I will add, that in relation to strawberries, with a single exception, the females of the various classes of Scarlet, Black, Pine, Hautbois, and Wood, and Alpine, may be readily crossed by any male of these several classes. This single exception is the female Hautbois; it can only be impregnated by a male Hautbois; while a male Hautbois will impregnate the female of any kind.

We have alluded to Mr. Burr's seedlings. A report of the Columbus, O., Horticultural Society states that he has exhibited some fifty varieties. Seven of these are described. The *descriptions* compare disadvantageously with those of Dr. Brinkle. No sufficiently distinct account is given of their parentage. All our information is that of the last paragraph, by which we know, generally, but not individually, the origin. "All Mr. Burr's new varieties were a cross between this (Burr's Seedling) the Hudson, Methven, and Hovey's seedling." Were *all* from *a* cross—a single cross —or was each from a separate impregnation? We suppose the latter to be meant, though the language asserts the former proposition.

The *New Pine* is said to be of "surpassing excellence." The *Ohio Mammoth* is described thus: "fruit extraordinarily large, probably exceeding all others in size, the berries averaging much larger than Hovey's, * * *a perfect flowering plant*, * * vigorous and *productive*." We are not disposed to deny facts; but when statements are contrary to usual experience and to what seems to us well established laws, we require facts to be well authenticated before we receive them. We must have a clear statement, upon an ample experience, of competent and intelligent cultivators, before we shall believe that a variety, perfect in both of the reproductive organs, will produce "extraordinarily large fruit" and in great abundance.

From the remarks made it is proper that we should express a more explicit opinion of the report of this committee of the Columbus Horticultural Society. If these four gentlemen have proved these varieties in their own grounds, or if they have been careful observers of these varieties in the grounds of others and state the facts of their report upon their *own knowledge*, we should, without a moment's hesitation, receive their statements. No one would dream that either of them would wilfully mis-state. But we can imagine a case where the most conscientious man might send out very erroneous statements. Let us imagine a Fair; a multiplicity of fruits, and of business; several gentlemen of standing are appointed a committee, simply because they are the best that can be had, and not because they are quite at home on the subject submitted. They retire to a room; the strawberries are presented; they exert themselves most laudably to do with all their might what their hands (and mouths) find for them to do. The berries are passing fine, and not the least slight is put upon them by their delighted admirers. Now comes the record. The cultivator is questioned; his observations recorded; *his* opinion and experience form their report. If the exhibitor be well informed, and cautious, it is all very well; but, whether he is or not, the report is not the testimony of the committee, but of a witness before them; and yet it goes out as their judgment, and its influence with the public is owing to the personal worth of the committee. Now, in all cases, we think it should appear whether a committee *know* what they state; whether the report is the result of investigation, or whether it is simply the testimony of an individual exhibitor. Now, in the case in hand, has Mr. Latham, or Mr. Bateham, or Mr. Medary, or Mr. Miller, ever examined the Ohio Mammoth; first to ascertain the character of its blossoms, and then, with reference to this, to ascertain its habit in fruiting and the character of its fruit?

The *Rose, Rival Hudson, Columbus, Sciota*, and *Burr's Seedling* are the other varieties very highly commended.

DO VARIETIES OF FRUIT RUN OUT.

We find in the American Agriculturist for August the following paragraph from a correspondent:

"My idea is that a tree has a limit as to age, and that in propagating any particular kind of fruit by ingrafting or inoculating, you do not renew, you merely continue. Am I to understand you as controverting this position? Do you mean to be understood as asserting that any particular kind of fruit, the Newtown Pippin, for instance, may be kept in existence forever? My idea is, that nature has, in the vegetable as well as the animal kingdom, provided one, and only one way for the renewal of life, and that is by the seed. That by engrafting you merely continue what is already in existence — that the tree which you obtain by ingrafting, is no younger than the tree from which that particular variety was originally obtained."

Is there such similarity between animals and vegetables, in their organic structure, development and functions, as to make it safe to reason upon the properties of the one from the known properties of the other?

It is admitted that the lowest forms of vegetable existence are extremely difficult to be distinguished

from a corresponding form of animal existence. As we approach the lower confines of the vegetable kingdom, flowers, and of course, seeds, disappear. The distinction between leaves and stem ceases; and, at last, the stem and root are no longer to be separated, and we find a mere vegetable sheet or lamina whose upper surface is leaf and whose lower surface is root. In a corresponding sphere animal existence is reduced to its simplest elements. Whatever resemblances there are in the lowest and rudimentary forms of vegetable and animal life, it cannot be doubted that when we rise to a more perfect organization, the two kingdoms become distinct, and the structure and functions of each are in such a sense peculiar to itself, that he will grossly misconceive the truth who supposes a structure or a function to exist in a vegetable, because such structure or functions exist in an animal, and *vice versa*. To be sure, they resemble in *generals* but they differ in *specials*. Both begin in a seminal point—but the seed is not analogous; both develop—but not by an analogous growth; both require food, but the selection, the digestion and the assimilation are different. The mineral kingdom is the lowest. Out of it, by help of the sun and air, the vegetable procures its materials of growth; in turn the vegetable kingdom is the magazine from which the animal kingdom is sustained; to each, thus, the soil contains the original elements; the vegetable is the chemical manipulator, and the animal, the final recipient of its products. The habit of reasoning from one to the other, of giving an idea of the one by illustrations drawn from the other, especially in popular writings, will always be fruitful of misconceptions and mistakes.

The next idea set forth in the paragraph which we review, is, the *essential dissimilarity of buds and seeds*. The writer thinks that a plant from a seed is a *new* organization, but a plant from a bud or graft (which is but a developed bud) is but a continuation of a previous plant. With the exception of their integuments, a bud and a seed are the *same thing*. A seed is a bud prepared for one set of circumstances, and a bud is a seed prepared for another set of circumstances—it is the same embryo in different garments. The seed has been called, therefore, a "primary bud," the difference being one of *condition* and not of *nature*.

It is manifest, then, that the plant which springs from a bud is as really a new plant as that which springs from a seed; and it is equally true, that a seed may convey the weakness and diseases of its parent with as much facility as a bud or a graft does. If the feebleness of a tree is general, its functions languid, its secretions thin, then a bud or graft will be feeble,—and so would be its seed; or if a tree be thoroughly tainted with disease, the buds would not escape, nor the tree springing from them—neither would its seed, or a tree springing from it. A tree from a *bud* of the Doyenné pear is just as much a new tree as one from its *seed*.

The idea which we controvert has received encouragement from the fact, that a bud produces a fruit like the parent tree, while, often times, a seed yields only a *variety* of such fruit. But, it is probable that this is never the case with seeds except when they have been brought into a state of, what Van Mons calls, *variation*. In their natural and uncultivated state, seeds will reproduce their parent with as much fidelity as a bud or a graft.

The liability of a variety to run, out when propagated by bud or graft, is not a whit greater than when propagated by seed, *in so far as the nature of the vegetable is concerned*.

But it is true that the conditions in which a bud grows render it liable to extrinsic ills not incidental to a plant springing from seed. A seed, emitting its roots directly into the earth, is liable only to its own ills; a bud or graft, emitting roots, through the alburnum of the stock on which it is established, into the earth, is subject to the infirmities of the stock as well as to its own.—Thus, a healthy seed produces a healthy plant. A healthy bud, may produce a feeble plant, because inoculated upon a diseased branch or stem.

Instead of a limitation in their nature, there is reason to suppose that trees might flourish to an indefinite age were it not for extrinsic difficulties. A tree, unlike an animal, is not a single, simple organization, it is rather a *community* of plants. Every bud separately is an elementary plant, capable, if disjoined from the branch, of becoming a tree by itself. In fact, each bud emits roots, which, uniting together, go down upon a common support (the trunk) and enter the earth, and are there put in connection with appropriate food. Every fibre of root may be traced upward to its bud from which it issued.

In process of time, the elongation of the trunk exposes it to accidents; the branches are subject to the force of storms; in proportion as the distance from the roots increases, and the longer the passages through which the upper sap, or downward elaborated sap travels, the more liabilities are there to stoppage and injury. The reason of decline in a tree is not to be looked for in any exhaustion of vital force, in the organization itself, but it is to be found in the immense surface

and substance exposed to the wear and tear of the elements.

It would seem, if this view be true, that no bounds can be placed to the duration of perennial plants, if, by any means, we could diminish their exposure, by reducing their expansion, by keeping them within a certain sphere of growth. *Now this is exactly what is accomplished by budding.* A bud, far removed on the parent stock from the root and connected with it through a long trunk, is inoculated upon a new stock. It now grows with a comparatively limited exposure to interuption or accident. The connection with the soil is short and direct.

In this manner a variety of fruit may be perpetuated to all generations, *if the laws of vegetable health be regarded in the process.* Healthy buds, worked upon healthy stocks and planted in wholesome soil, will make healthy trees; and from these another generation may proceed, and from these another. By a due regard to vegetable physiology, the Newtown Pippin, and the Seckle Pear, may be eaten two thousand years hence, *provided, always*, that expounders of prophesy will allow us the use of the earth so long for orchard purposes. A disregard of the laws of vegetable physiology in the propagation of varieties, will, on the other hand, rapidly deteriorate the most healthy sort. There is no clock-work in the branches of the tree, which finally runs down past all winding up; there is no fixed quantity of vitality, which a variety at length uses up, as a garrison does its bread. Plants renew themselves and every year have a fresh life, and, in this respect, they differ essentially from all forms of animal existence. Any *one tree* may wear out; but a *variety*, never.

We need not say, therefore, that we dissent from Knight's theory of natural exhaustion and from every supplement to it put forth since his day. Van Mons' theory of *variation* and the tendency of plants to return toward their original type, is to be regarded as nearer the truth.

WHITE CLOVER.

In a communication of Mr. Brady, the reader will find the following remark: "If you had been as much perplexed as I have with the effect of *white clover*, it strikes me that you would not have recommended J. F. K. to sow it on his farm, nor cultivate it in any way whatever."

Our correspondent's objections arise, we presume, from the disposition of white clover (called also Dutch clover, *trifolium repens*) to *spread*, and from its almost invincible tenacity of life. On these accounts it *is* vexatious in a garden, and in *cultivated* fields. But Mr. Brady will, upon reperusing, perceive that we were advising J. F. K. in respect to the formation of a *pasture* sward. We are inclined to suppose that the excellencies of white clover have not been enough esteemed among our farmers; indeed, they have adopted a few grasses as special favorites upon whom all favors are lavished and the rest are totally or very nearly rejected.

In regions where dairies abound, and where, therefore, the subject of pasturage is of vital interest, those grasses are sown which spring early in the year and continue late; which grow quickly, abundantly, and shoot again rapidly after being cropped; which are nutritious; which tend to produce milk, and impart to it high flavor. If any *one* grass possessed all these properties it would be perfect; and, for pastures, all others might be rejected. As it is, several grasses must conspire to form a *sward* possessed of these diverse excellencies. In this joint result white clover bears no mean place. It is, on congenial soils, of vigorous growth, eminently conducive to the production of milk, and milk of fine flavor. These are its peculiar virtues. Besides these, it possesses, in common with other pasture plants, hardiness, tenacity of life, nutritiousness for beef-cattle. Thaër, the most eminent practical, and scientific cultivator of his day, says: "*it is certainly the most generally approved of all plants that are cultivated for this* (pasture) *purpose.*" Sinclair, whose authority in grasses will not be disputed, says; "nor does it form a good pasture when sown *by itself*, * * but, combined with other grasses, it is a valuable plant." Great quantities of seed are annually sown in England by the best farmers. Fessenden, of New England, says "it does not contain as much nutritive matter as red clover; yet its value as a *pasture-grass is universally admitted.*" This is the experience of Germany, England, and New England. Has experience determined that these good qualities are suppressed in western pastures? Or is there such a prejudice against it on account of its prying, intrusive disposition in arable lands, that our farmers are unwilling to give it a chance? At any rate, our friend will exonorate us from rashly recommending, without authority, a useless and vexatious plant. Who has had experience? Who can tell us anything more for or against white clover? The Farmer and Gardener will keep its ears open to hear any one that shall speak.

It is not perhaps commonly considered how much the strength, permanence, and vivacity of love depend upon the circumstances of an intimate acquaintance with the spirit of its object—its habits, purposes, infirmities, burdens, sorrows.

COMMUNICATIONS.

CROPS IN FRANKLIN COUNTY---DEEP AND SHALLOW PLOWING FOR WHEAT.

FRANKLIN COUNTY, Ia., Aug. 17, '46.

In perusing the thirteenth number of your paper, page 194, I find the following. "Will our readers who cut wheat drop us a line immediately after harvesting; giving a brief account of their crops and store in their neighborhood." In answer to your request, I now proceed to give you thy desired information; (with the presumption, better late than never.) My wheat was something over an average crop, for me to raise; about one-half of it well fielled, and plump, fair grain, and the other half much injured with the rust. All the Alabama wheat (which was sown in good season,) was unusually good; that sown late, with some other kinds of wheat, was badly injured. From what I have been able to learn, my impression at present is, that the surplus of Franklin county will exceed that of former years at least one-fourth. Wheat is worth only forty cents per bushel in Brookville, *a price quite too low to justify.* Our meadows were generally heavy, consequently hay is very plenty, and in poor demand. Oats were heavy, and the grain unusually plump and fair. It is yet hard to judge of our prospects for corn, owing to the uncertainty of its getting ripe. Should the fall be favorable, our crops no doubt will be very heavy.

Permit me now to waive the subject, and in answer to your former request, record one of my many failures, *that of raising wheat.* I have already said, "my wheat was something over an average crop for me, to raise." Such is the fact; yet I frankly admit, that I have come farther short of my expectations, in the culture of wheat than in that of any other. It has been a uniform practice with me to plow deep on all occasions, whether for wheat or corn. My strict adherence to that rule, has caught the eyes of some of my neighbors, who eave seen proper to remonstrate against my course, stating that they verily believed that my failures in raising wheat were occasioned, principally, by my *deep plowing.*

Having noticed the practice of some farmers for years, who only scratched the ground preparatory to seeding, and witnessed them raising better wheat than I do, in connection with the remonstrance of my neighbors, I have been almost staggered as to my former practice of deep plowing *for wheat.* I have never had any doubts of the utility of tearing up the ground deep for all other purposes, even with a *subsoil plow.*

I should be pleased to have an answer through the columns of your paper to the following questions:

1. Is it advisable to plow deep on all occasions, or is a medium depth the best? And

2. Should land always be plowed the same way, or is it best to cross at each subsequent plowing?

I should be pleased to advert to some other subjects, but time forbids, at present. In conclusion, I will only add: If you had been perplexed as much as I have with the effects of *white clover;* it strikes me that you would not have recommended J. F. K. to sow it on his farm, nor cultivate it in any whatever.

JOHN P. BRADY.

We ask for the *experience* of our readers on the subject of plowing. Will they tell us, as Mr. Brady has *not*, the character of their soil. Is it bottom, or bench, or upland? Is it clay, or sand or loam? Is it calcareous, or vegetable, ?—What is the nature of the surface-soil? What is the character of the subsoil? Is it dry or wet; is it gravel, or gravel and sand, or gravel and clay? is it clay—blue, yellow, or white? In short, tell us *what* it is you plow; *how* you plow it; what the results have been; how *long* you have tried it; and how your mode compares with different ones, employed by others or by yourself, formerly. If then, it is necessary for us to say anything, we shall have something to say.—*Ed.*

SAGE SEED---DEATH BY SLOBBERING.

SAGE SEED.—Very few persons appear to be aware how large a proportion of the seeds of the common garden sage is devoid of any vegetating principle. After carefully gathering the seeds from a bed about twenty feet long, (I am thus particular in order to give some idea of the extent of the experiment) I emptied them into water to separate the sound seeds from the defective ones. Not more perhaps than about one-third of the seeds sank to the bottom; of those which floated, by far the greatest quantity appeared plump, full-sized, and to promise to germinate; but on crushing them, they were found to be hollow; and on sowing them, by way of experiment, they did not grow. As most of the uninitiated would have sown these lifeless seeds with the perfect ones, comparatively few plants would have appeared in the bed; and the sower would have wondered at the sparse vegetation. But *sound* sage seeds I believe germinate as well as most other seeds; they are, however, among the most tardy, requiring from three to five weeks to appear above ground. They are much more likely to succeed well, when not old; and, perhaps, better directly after being gathered, than at any other time. I have caused them to sprout in a week, by careful application of warmth and moisture.

SLOBBERING IN HORSES.—Some questions on this subject were asked by the editor in vol. 1, p. 212; and some replies were given on p. 250. As it is desirable to make the Farmer and Gardener a store-house for all useful facts of an appropriate character, I have cut out the annexed paragraph as reliable evidence that animals *may be* salivated to death. I think it is the first instance of the kind I have seen reported. It is possible death was brought about by come concurrent circumstance. Why don't the farmers impart what information they have on this subject?

It will be observed that the writer calls the affection produced by the clover, "water-brash." This is an objectionable term in this case; and should not be adopted. The fluid issues from the salivary glands; and is not an eructation from the stomach; it cannot therefore be water-brash.

"J. P. Spencer, Esq., senior editor of the Centreville Times, had two valuable mules killed by the water-brash, the present week. The mules

were in a distant clover pasture, which had been rendered more succulent from the late abundant rains. There were seven mules in the field, and four of the living ones were nearly on the lift from the same cause. A change of pasture and a free use of table salt saved their lives."

J. T. P.

DON'T PICK THEM BEFORE THEY ARE RIPE.

Mr. Editor:—You have given us such accurate descriptions of many of those enemies to our fruit and vegetables, that I have been expecting to hear you speak of another common enemy, which destroys more fruit before it comes to perfection, than any one you have named.

I do not refer to the curculio, for they were so starved out last summer, and frozen out last winter, that our apricots and peaches and very few of our plums are injured by them this year. I do not refer to the rot which is already destroying many peaches and apples, and takes its stand close by the stem of many of our best varieties of plums and is destroying some of them entirely, leaving us, however, the large yellow gage, Prince's white gage, and a very large excellent *nameless* black plum almost entirely uninjured. Neither do I refer to the worm which kills the peach trees, for I have braided ropes of the ribs of tobacco leaves and tied them around the trees at the surface of the ground, or have kept a hill of fine charcoal two inches high around the root, then watched the tops when there was any bruise or split so that the insect could find a tender place in the bark where she could deposit her eggs, and thus have preserved both the roots and tops from their depredations. Neither do I refer to the badly trained and roguish boys which in days that are gone have done so much injury to tender fruit. No, I refer to the *fingers* and *teeth* of our own family. I heard a man say three years ago that there never was a *ripe* cluster of grapes in Madison. The usual method is for any or all of the family to begin to pick single grapes as soon as they change their color, so that there can never be found one ripe cluster upon a vine that has bushels.

If there is a choice peach tree, all have access to it; and as soon as the first peach begins to show its colors it is picked and crushed and not one is left to ripen. If there is a fine June or July apple tree, it is shaken, and all the aparatus of ladders, poles, and even clubs and brickbats are brought into requisition, so that every bud on the limbs is admonished not to be guilty of bearing an apple the next year.

Thus, after a man has prepared his ground and purchased his trees at great expense; paid the gardener from year to year for pruning; has defended them from insects and robbers, and waited till they are loaded with *almost* ripe fruit, he suffers it to be beaten off, and eaten by himself and his own family, when it is both unhealthy and unpalatable, and destroys one of the most healthy and delicious luxuries that can be enjoyed.

My Peach apricot was superfine. I budded the top of a large peach tree in the fall of 1844, and this year, I have most excellent fruit upon these buds that grew some four or six feet last year. One fine variety ripened the ninth of July, three weeks earlier than the New York rareripe or early red rareripe this year. I had one superb peach up in that top from a bud I put in last fall, where the bud proved to be a fruit-bud, instead of a wood-bud.

H. Little.

SELECTIONS.

STRUCTURAL BOTANY,

Applied to Horticulture---Sap.

The fluid matter which is absorbed either from the earth or from the air is called sap.

When it first enters a plant it consists of water holding certain principles, especially carbonic acid, in solution.

These principles chiefly consist of animal or vegetable matter in a state of decomposition, and salts, and are energetic in proportion to their solubility, or tendency to form carbonic acid by combining with the oxygen of the air.

Sap soon afterwards acquires the nature of mucilage or sugar, and subsequently becomes still further altered by the admixture of such soluble matter as it receives in passing in its route thro' the alburnum or newly formed woody tissue.

When it reaches the vicinity of the leaves it is attracted into them, and there, having been exposed to light and air, is converted into the secretions peculiar to the species.

It finally, in its altered state, sinks down the bark, whence it is given off laterally by the medullary rays, and is distributed through the system.

The cause of the motion of the sap is the attraction of the leaf-buds and leaves.

The leaf-buds, called into growth by the combined action of the increasing temperature and light of spring, decompose their carbonic acid, and attract fluid from the tissue immediately below them; the space so caused is filled up by fluid again attracted from below, and thus a motion gradually takes place in the sap from one extremity to the other.

Consequently the motion of the sap takes place first in the branches and last in the roots.

For this reason a branch of a plant subjected to a high temperature in winter will grow while its stem is exposed to a very low temperature.

But growth under such circumstances will not be long maintained, unless the roots are secured from the reach of frost: for, if frozen they cannot act, and will, consequently, be unable to replace the sap of which the stem is emptied by the attraction of the buds converted into branches, and by the perspiration of the leaves.

Whatever tends to condense the sap, such as a dry and heated atmosphere, or an interruption of its rapid flow, or a great decomposition of carbonic acid by full exposure to light, has the property of causing excessive vigor to be diminished, and flower-buds to be produced.

While, on the other hand, whatever tends to dilute the sap, such as the free and rapid circulation of it, a damp atmosphere, or a great accumulation of oxygen in consequence of the imperfect decomposition of carbonic acid, has the property of causing excessively rapid growth, and an exclusive production of leaf-buds.

Condensed or accumulated sap is, therefore, a great cause of fertility.

And thin fluid, not being elaborated, is a great cause of sterility.

The conversion of sap into different kinds of secretion is effected by the combined action of *air*, *light*, and *temperature*.

Mr. Knight is of opinion, founded like all his opinions, on well-conducted experiments, that the motion given to plants by the wind, enables their fluids to circulate more freely and is thus beneficial.

AIR AND LIGHT.

When an embrio plant is formed within its integuments, it is usually colorless, or nearly so; but, as soon as it begins to grow, that part which approaches the light (the stem) becomes colored, while the opposite extremity (the root) remains colorless.

The parts exposed to the air absorb oxygen at night, absorb carbonic acid and part with oxygen again in daylight; and thus in the daytime purify the air, and render it fit for the respiration of man.

The intensity of this latter operation is in proportion to the intensity of solar light to which leaves are directly exposed.

Its cause is the decomposition of carbonic acid, the extrication of oxygen, and the acquisition by the plant of carbon in a solid state; from which, modified by the peculiar vital actions of species, color and secretions are supposed to result.

For it is found that the intensity of color and the quantity of secretions are in proportion to the exposure to light and air, as is shown by the deeper color of the upper side of leaves, &c.

And by the fact, that if plants be grown in air from which light is excluded, neither color nor secretions are formed, as is exemplified in blanched vegetables; which, if even naturally poisonous, may, from want of exposure to light, become wholesome, as Celery.

When any color appears in parts developed in the dark it is generally caused by the absorption of such coloring matter as pre-existed in the root or other body from which the blanched shoot proceeds, as in some kinds of Rhubarb when forced.

Or by the deposition of coloring matter formed by parts developed in light, as in the subterranean roots of beet, carrots, &c.

What is true of color is also true of flavor, which equally depends upon light for its existence; because flavor is produced by chemical alterations in the sap caused by exposure to light.

The same thing occurs in regard to nutritive matter, which in like manner is formed by the exposure of leaves to light. Thus the Potato when forced in dark houses contains no more farinaceous matter than previously existed in the original tuber; but acquires it in abundance when placed in the light, and deposits it in proportion as it is influenced by light and air. Thus, also, if peaches are grown in wooden houses, at a distance from the light, they will form so little nutritive matter as to be unable to support a crop of fruit, the greater part of which will fall off. And for a similar reason it is only the outside shoots of standard fruit trees that bear fruit. Considerations of this kind form in part the basis of pruning and training.

Light is the most powerful stimulus that can be employed to excite the vital actions of plants, and its energy is in proportion to its intensity; so that the direct rays of the sun will produce much more powerful effects than the diffused light of day.

Hence, if buds, that are very excitable are placed in the shade, their excitability will be checked.

And if buds that are very torpid are exposed to direct light, they will be stimulated into action.

So that what parts of a tree shall first begin to grow in the Spring may be determined at the will of the cultivator.

This is the key to some important practices in forcing.

This should also cause attention to be paid to shading buds from the direct rays of the sun in particular cases: as in that of cuttings, whose buds, if too rapidly excited, might exhaust their only reservoir of sap, the stem, before new roots were formed to repair such loss.

As plants derive an essential part of their food from the air by the action of light, it follows that in glass-houses those which admit the greatest portion of light are the best adapted for purposes of cultivation.

And as it has been found by experiment, that light passes more freely through a curvilinear than through a plain roof, and through glass forming an acute angle with the horizon than through perpendicular glass, it follows that a curvilinear roof is best, and a plane roof with glass perpendicular sides the worst adapted to the purposes of the cultivator.

For the same reason common green glass is less fitted for glazing forcing-houses than white crown glass.

Poisonous gases in very minute quantities act upon vegetation with great energy. A ten thousandth part of sulphurus acid gas is quickly fatal to the life of plants; and hence the danger of flues heated by coal fires, and the impossibillty of making many species grow in the vicinity of houses heated by coal fires, or in large towns.

Heating by hot water is now so well understood, and so simplified by the method of first heating the air in a large reservoir, or air-chamber, from which it circulates to any required part, either of a green house or dwelling house, that no one erecting a glass structure for plants would now think of heating on the old principle of the fire flue.—*Teschemacher*.

ON the PRINCIPLES of ARTIFICIAL MANURING, BY BARON LEBIG.

[We hope every farmer will read the subjoined article upon the philosophy of manuring; its language is simple and popular; Leibig, is, beyond controversy, the greatest European chemist of his age, and his extraordinary labors in behalf of agricultural interests, should make his name known and honored by every cultivator of the soil.—*Ed.*]

If we compare the experience of farmers regarding the fertility of the soil and the quantity of its productions, we are surprised by a result which surpasses all others in general application and uniformity.

It has been observed, that in every part of the globe where agriculture is carried on, in all varieties of soil, and with the most different plants and modes of cultivation, the produce of a field on which the same or different plants have been cultivated during a certain number of years, decreases more or less in quantity, and that it again obtains its fertility by a supply of excrements of man and animals, which generally are called ma-

ure; that the produce of the fields can be increased by the same matters, and that the quantity of the crop is in direct proportion to the quantity of the manure.

In former times scarcely any attempt was made to account for the cause of this curious property of the excrements of man and animals. Without taking into consideration the origin of the excrements, and the relation they bear to the food, it was not astonishing that their effect was ascribed to a remnant of vital power which should qualify them to increase the vitality in plants. Ascribing their influence on the fertility of the fields to an incomprehensible occult cause, it was forgotten that every force has its material substratum; that with a lever, in a mathematical sense, which possesses no extension and gravity, no effect can be produced, no burden raised.

Guided by experience, which is the fundamental basis of all inductive science, and which teaches us that for every effect there is a cause, that every quality, as, for instance, the fertility of a field, the nourishing quality of a vegetable, or the effect of a manure, is intimately connected with and occasioned by something which can be ascertained by weight and measure; modern science has succeeded in enlightening us on the cause of the fertility of the fields, and on the effects which are exercised on them by manure.

Chemistry has shown that these properties are produced by the composition of the fields; that their fitness for producing wheat or some other kind of plants bears a direct proportion to certain elements contained in the soil, which are absorbed by the plants. It has likewise shown that two fields, of unequal fertility contain unequal quantities of these elements; or that a fertile soil contains them in a different form or state from another, which is less fertile. If the elements are contained in the soils in sufficient quantities, it produces a rich crop; if it is defective in one of them only, this is shown very soon, by the impossibility of growing in it certain kinds of plants.

Moreover it has been proved with certainty what relations these elements of the soil bear to the development of the plants. Chemical analysis has demonstrated that a certain class of these elements is contained in the seeds; others in different proportions, in the leaves, roots, tubers, stalks. They are mineral substances, and as such, are indestructible by fire, and consequently remain as ashes after the incineration of the plants or of their parts. Many of these elements are soluble in pure water, others only in water containing corbonic acid, as rain water; all were absorbed from the soil by the roots of the plants in a dissolved condition. It has been shown that, if in a field, those elements which remain after the incineration of the grain or seeds, are present in an insufficient quantity, no wheat, no barley, no peas,—in a word none of those plants can be cultivated on that field which are grown on account of their seeds. The plants which grow on such a field produce stalks and leaves; they blossom but do not bear fruits. The same has been observed regarding the development of leaves, roots, and tubers, and the mineral elements which they leave behind after their incineration. If, in a soil in which turneps and potatoes are to be cultivated, the elements of the ashes of these roots are wanting, the plants bring forth leaves, stalks, blossoms, and seeds, but the roots and tubercles are imperfect. Every one of the elements which the soil gives up to the plants is in a direct quantative proportion to the production of the separate elements of the plants. Two fields, which, under otherwise equal circumstances, are unequally rich in mineral elements of the grain, produce unequal crops. One containing them in large quantity produces more than another containing them in less. In the same manner, the capacity of a soil to produce tuberculous plants, or such as have many leaves, depends upon its amount of the elements of the soil which are found in the ashes of those plants.

It results from this with certainty, that the mineral substances which are furnished by the soil, and which are found again in the ashes of plants, are their true food; that they are the conditions of vegetable life.

It is evident, that from a field in which different plants are cultivated, we remove with the crop a certain quantity of these elements; in the seeds those mineral parts which the soil had to provide for *their* development, and in the roots, tubercles, stalks, and leaves, those elements which are necessary for *their* production. However rich the field may be in these elements, there can be no doubt that, by several cultures, it becomes more and more impoverished; that for every plant a time must arrive when the soil will cease to furnish, in sufficient quantity, those elements which are necessary for a perfect growth. Even if such a field, during many subsequent years, produced twenty-five or thirty fold the amount of the seed; for instance, of wheat, experience shows that the crop gradually decreases, until at last the amount will be so small that it approaches the plant in its wild state, and would not repay the cost of cultivation.

According to the unequal quantity in which the mineral elements of grain, tubercles, roots, seeds, leaves are contained in a soil, or according to the proportions in which they may have removed in the crop, the land may have ceased to be fertile for roots and tubercles, but it may yet produce good crops of wheat. Another may not produce wheat, but potatoes and turneps may thrive well in it. The mineral substances contained in a fertile soil, and serving as food to the plants, are taken up by them with the water, in which they are soluble. In a fertile field they are contained in a state which allows of their being absorbed by the plant and taken up by the roots. There are fields which are rich in these elements, without being fertile in an equal proportion; in the latter case they are united with other elements into chemical compounds, which counteract the dissolving power of water. By the contemporaneous action of water and air,—of the oxygen and carbonic acid of the atmosphere,—these compounds are decomposed, and those of their constituent elements, which are soluble in water, but which had been insoluble by the chemical affinity of the other mineral substances, re-obtain the property of being absorbed by the roots of the plants.

The duration of the fertility of a field depends on the amount of the mineral aliments of plants contained in it, and its productive power for a given time is in a direct proportion to that part of its composition which possesses the capacity of being taken up by the plant. A number of the

most important agricultural operations, especially the mechanical, exercise an influence on the fertility of the fields only thus far, that they remove the impediments which are opposed to the assimilation of the mineral food into the vegetable organism. By plowing e. g., the surface of the fields is renewed and made accessible to air and moisture. The nutritious elements contained in the soil in a latent state, acquire by these operations, the properties necessary for their transmission into the plants. It is easy to conceive the useful influence which, in this respect, is exercised on the produce of the fields by the care and industry of the farmer. But all these labors and efforts do not increase the amount of mineral elements in the field; in rendering soluble in a given time, a larger quantity of the insoluble substances, and obtaining by these means a richer crop — the time is merely hastened, in which the soil becomes exhausted.

The experience of centuries has shown that, with the help of manure, of the excrements of animals and man, with which we supply those fields which have ceased to produce crops of grain, &c., serving as food for man and animals, in a sufficient quantity, the original fertility can again be restored; an exhausted field which scarcely yielded back the seed, is made to produce a twenty and more fold crop, according to the proportion of the manure provided.

Regarding the mode of action of the manure, it has been observed, that all excrements do not exercise an equal influence on plants. The excrements of sheep and cattle, for instance, increase in most fields the crop of roots and herbaceous plants to a far greater degree than those of man and birds, (guano.) The latter act far more favorably on the production of the cerealia, especially if they are added to the animal excrements, and are given to the fields at the same time.

A field, for example, which has lost it fertility for potatoes and turneps, but on which peas and beans still thrive, becomes far more fertile, by a supply of the excrements of horses and cows, for a new crop of potatoes and turneps, than by manuring it with the excrements of man or with guano.

The most accurate experiments and analyses have pointed out that the excrements of man and animals contain those substances, to the presence of which the fertility of the soil is due. The fertilizing power of manure can be determined by weight, as its effect is in a direct ratio to its amount in the mineral elements of the food of plants. The truth of the result of these chemical analyses must be evident to every one who inquires into the origin of excrements.

All the excrements of man and animals are derived from the plants of our fields; in the oats and hay which serve as food to the horses, in the roots which are consumed by a cow, there are a certain quantity of mineral ingredients. A horse, in consuming fifteen pounds of hay and four and a half pounds of oats per day, consumes twenty-one ounces of those substances which the hay and the oats took from the fields; he consumes annually 480 pounds of these constituent elements of the soil, but only a very small portion of them remains in his body. If a horse during one year, increases 100 pounds in weight, this increase contains only seven pounds of those mineral substances which were contained in the food. But what has become of the 473 pounds which we cannot detect in his body?

The analysis of the fluid and solid excrements which the horse gives out daily, shows that the ingredients of the soil which do not remain in the body of the animal are contained in its excrements; it shows that in an adult animal, which from day to day does neither increase nor decrease in weight, the amount of the mineral ingredients of the excrements is equal in weight to the mineral ingredients of the food.

As with the horse, so it is with all animals. *In all adult animals the excrements contain the ingredients of the soil according to the quantities and relative proportions in which they are contained in their food.*

The mineral substances of the food which have remained in the body of the animals, and served to increase their weight, are found again in the bones and excrements of man who consumes the flesh of these animals.

The excrements of man contain the elements of the soil, of bread or of grain, of vegetables and of meat.

These discoveries explain, in a most simple and satisfactory manner, the fertilizing effect which nature produces on our fields.

It is now obvious why manure renders again fertile the exhausted fields; why, by its means, their productiveness can be augmented; why the latter is in a direct ratio to the quantity of manure administered.

The exhaustion of the soil by subsequent crops, — its decrease in fertility, — is produced by the gradual removal of the mineral elements, in a soluble state, which are necessary for the development of our cultivated plants. By a supply of manure they are again restored to that state suited to serve as nourishment to a new vegetation. If the supply of the removed elements of the soil, by means of manure, be sufficient; if the quantity taken away be restored, the original fertility reappears; if the supply be greater, the produce increases; a defective supply gives a smaller produce.

It is now explained why the different kinds of manure exercise an unequal effect upon the fields.

The excrements of man, and the guano containing especially the mineral ingredients of grain and meat, exercise far greater influence on the amount of produce in grain in a field in which these ingredients are wanting, even if those of the leaves and stalks are present in sufficient quantity, than the excrements of an animal which feeds on roots or green fodder. The excrements of the latter contain the mineral elements of the leaves, stalks, and roots, in prevailing quantity, and have a greater value for the production of roots and foliaceous plants than those of man or of birds, which contain only a small quantity of those mineral substances which they require for their development.

If we compare, for instance, the composition of guano with the excrements of the cow—solid and fluid excrements in the same state — it is found, that in an equal weight, the latter contain from five to seven times more of the mineral ingredients of turneps and potatoes than the former. If, in a soil, which is deprived of all these mineral substances, we wish to force a crop of turneps by

means of guano, we require at least five times more of guano than dung of cattle.

The same thing happens, though *vice versa*, if we wish to produce a rich crop of grain by means of animal excrements; in this case, one part of guano and five parts of animal excrements produce the same effect, as 13.15 parts of animal excrements.

To understand the proper meaning of these numerical proportions, it is sufficient to mention, that 400 pounds of bones contain as much phosphoric acid as 1000 pounds of wheat; these 400 pounds of bones can furnish sufficient phosphoric acid to eight akers.

If we take the importation of bones into Great Britain, in the last ten years, to amount to one million of tons, enough phosphoric acid has been applied to the field twenty-five millions of tons of wheat; but only a small proportion of the phosphoric acid of the bones is in a state to be assimilated by the plants and applicable to the formation of the grain. The plants, in order to apply the other far greater part of that phosphoric acid to their formation, must find a certain quantity of alkaline bases besides the bone earth, which are not given to the plants in the bones, because they contain neither potash nor soda.

To have increased the fertility of the fields in the right proportion, 800,000 tons of potash ought to have been added to the one million of tons of bones, in a suitable form.

The same is the case with guano; 60 to 100 pounds of it are sufficient to furnish phosphoric acid to one aker of turneps; but the four to eight fold quadtity is required to furnish the turneps with the necessary alkaline bases. and it is still doubtful whether they can be at all provided with the latter, by means of the salts with alkaline bases, which the guano contains.

At a time, when the necessity of the mineral substances for the growth and development of the plants, and the direct relation which the effect of manure has to its amount of the same substances, had not been ascertained, a prominent value was ascribed to the organic matters which it contains. For a long time it was thought that the produce of a field of those substances, containing nitrogen, which serve as food for man and animals, stood in a direct proportion to the nitrogen contained in manure. It was believed that its commercial value as manure, might be expressed in *per cents* by its proportion of nitrogen, but later and more convincing observations have induced me to contradict this opinion.

If the nitrogen and carbonic acid formed by the decay and decomposition of the vegetable ingredients of manure, were the cause of its fertilizing power, this ought also to be seen if the mineral substances are excluded. Direct experiments have shown, that the nitrogen of the excrements can be assimilated by the plants, in the form of ammonia; but that ammonia as well as carbonic acid, although it is indispensable for the development of all plants, can accelerate the growth of plants and increase the produce of a field of grain, roots, and tubercles *only*, if, at the same time, the mineral ingredients contained in the manure which is applied, are in a state in which they are suited for assimilation. It the latter are excluded, carbonic acid and ammonia have no effect on vegetation.

On the other hand, experience has shown that on many fields the produce which is rich in carbon and ammonia, can be increased to an extraordinary amount without any supply of such matters as furnish these substances.

On fields which are provided with a certain quantity of marl or slacked lime, or with bone earth or gypsum, substances which cannot give up to the plants either carbon or nitrogen — rich crops are obtained in many places, of grain, tubers, and roots, entirely in contradiction to the view which ascribes the effect of the manure to its amount of ingredients containing nitrogen or carbonic acid.

To explain this process, which is so opposite to the common opinion, the marl, the lime, the gypsum, the alkalies, and the bone earth were regarded as stimulants, which acted on the plants like spices on the food of man, of which it was believed that they increased the power of assimilation, and allowed the individuals to consume larger quantities of food.

This view is contradicted, if we consider that stimulants mean such substances as do not serve the nourishment of the organism or for the formation of organic elements, and can only increase the weight of the body, if at the same time a certain increase of food is given. In supplying the fields with the above mentioned substances, the weight of the plants became increased in all their separate parts, without there having been provided with the quantity of food, which according to theory, was necessary to this extraordinary increase, viz: with carbonic acid and ammonia.

Chemical analysis shows that these so called stimulants are either actual ingredients of manure, as gypsum, bone earth, and the active substances of the marl, or that they are the means by which the mineral elements contained in the soil are resolved into a state adapted for being assimilated by the plants; this is generally effected by by the application of slacked lime. They consequently exercise on the vital process of the plants not a mere stimulus like the spices, but are consumed for the development of the leaves, seeds, roots, &c.; they become constituent parts of them, as can be shown with certainty by chemical analyses.

The success which has followed the application of these substances to the fields has explained, in a most striking manner, the origin of the carbon and nitrogen in the plants.

In the marl, in the bone earth, in the gypsum, in the nitrate of soda, no carbon is provided to the fields: and yet, in many cases, the same produce, in some even a higher one was obtained, than by the application of a manure containing carbon and nitrogen. As the soil, after the crop, does not contain less carbonaceous or nitrogenous substances, it is evident that these products which had been obtained without any carbonic or azotic manures, must have got the carbon and nitrogen of their leaves, roots, and stalks, from the atmosphere; it follows therefore that the productiveness of the fields cannot be in proportion with a supply of carbonaceous and azotic substances, but that the fertility depends only on the supply of those ingredients which should be provided by the soil.—*Alb. Cult.*

[TO BE CONTINUED.]

COHESIVE POWER OF WATER — *Explosions in Steam Boilers.*—The London Chronicle states that Professor Faraday, in a recent lecture before the English scientific societies, mentioned that a young philosopher by the name of Donne had found that when water is carefully deprived of the air in solution, it may, if there be no breach of continuity among the particles, be raised to a height of one hundred feet, while under ordinary circumstances, thirty feet in round numbers, is the greatest altitude at which it can be supported. This phenomenon depends upon the strong cohesive force residing in these particles of water when deprived of all extraneous matter; for the moment a bubble of air is let in, that is to say, the moment a breach of continuity occurs, the water obeys the natural law and finds its own level.

The learned professor also mentioned another important experiment of young Donne, which may lead to a new theory in relation to explosions in steam-boilers, and account for many phenomena connected therewith, which have heretofore been inexplicable. It seems that water carefully deprived by boiling, of all the air in solution, instead of boiling at 112°, the boiling point of water under ordinary circumstances, may be raised to 275° Fahrenheit, without showing any signs of ebullition, as long as the continuity of the particles of water is not broken. Thus a force equal to three atmospheres is restrained only by the adhesion of the particles of water. At the temperature of 275°, it suddenly bursts into ebullition, with a loud explosion, dashing the containing vessel into fragments.

EXTRAORDINARY FLIGHT OF BUTTERFLIES.—One of the largest flights of butterflies ever seen in this country, crossed the Channel from France to England, on Sunday last. Such was the density and extent of the cloud formed by the living mass, that it completely obscured the sun from the people on board our continental steamers, on their passage, for many hundreds of yards, while the insects strewed the decks in all directions. The flight reached England about twelve o'clock at noon, and dispersed themselves inland and along shore, darkening the air as they went. During the sea-passage of the butterflies the weather was calm and sunny, with scarce a puff of wind stirring; but an hour or so after they reached terra-firma, it came on to blow great guns from the S. W., the direction whence the insects came.—*Canterberry (Eng.) Journal.*

ANTIQUITY OF DROLLERY.—The Athenians, with all their intellectual brilliancy, were fond of what we call "broad grins." We were lately much struck by a Greek epigram upon a man with a huge nasal organ, the humor of which is precisely in the extravagant vein of the Americanisms of the present day. One Ploclus is said to have had such a length of nose that he never heard himself sneeze! Who would not take this to be a flower culled from a Kentucky newspaper."

Athenæum.

A HAPPY THOUGHT.—The magnificent bridge, built at the city of Manheim, over the Necker, has just been consecrated to the public service, by a novel ceremony of inauguration, which deserves recording. A procession of eighty wagons was driven across, laden with provisions, fire-wood, and turf, which were afterwards distributed gratuitously amongst the poor.—*Athenæum.*

A SMALL PRESENT.—"I will give you my head," exclaimed a person to Montesquieu, "if every word of the story I have related is not true." "I accept your offer," said the president, "presents of so small value strengthen the bonds of friendship, and should never be refused."

A FRIEND IN NEED.—A gentleman unaccustomed to public speaking, becoming embarrassed, whispered to his friend, "Quick, give me a word!" Upon which the other replied, "Yes, yes, what word do you want?"

Great talents for conversation require to be accompanied with great politeness. He who eclipses others owes them great civilities, and, whatever mistaken vanity may tell us, it is better to please in conversation than to shine in it.

If we go at noonday to the bottom of a deep pit, we shall be able to see the stars, which, on the level ground, are invisible. Even so, from the depths of grief, worn, wretched, scaled, and dying—the blessed aspirations and tokens of heaven make themselves visible to our eyes.

The authority of a *father*, so useful to our well-being, and so justly venerable upon all accounts, hinders us from having that entire love for him that we have for our *mothers*, where the parental authority is almost melted down into the mother's fondness and indulgence.

When any great and predominant passion rules the heart of man, all the others are submissive to it. Thus, in covetous minds, if avarice be the prevailing passion, love must give way purely to avoid the expenses it may cause in its pursuit and gratification; whereas, on the contrary, when love is the reigning passion, even avarice itself will be converted into profuseness.

CONTENTS OF THIS NUMBER.

NOTICE OF NEW WORKS; THE SEASON; WHAT ONE MAN CAN DO FOR HIS COUNTRY, - 257
HORTICULTURAL CHIT CHAT, - - - 258
AMERICAN WHEAT IN GREAT BRITAIN; CULTURE OF PIE PLANT, - - - - - 259
THEORY OF MANURE, - - - - 261
NEW SEEDLING STRAWBERRIES, - - 262
DO VARIETIES OF FRUIT RUN OUT - - 263
WHITE CLOVER, - - - - - 265
CROPS IN FRANKLIN COUNTY, DEEP AND SHALLOW PLOWING FOR WHEAT, - - - 266
DON'T PICK THEM BEFORE THEY ARE RIPE; STRUCTURAL BOTANY - - - - - 267
ON THE PRINCIPLES OF ARTIFICIAL MANURING, 268
COHESIVE POWER OF WATER; ANTIQUITY OF DROLLERY; A HAPPY THOUGHT; A SMALL PRESENT, - - - - - - 272

TERMS.—*The* FARMER AND GARDENER *is published* SEMI-MONTHLY, *each number containing Sixteen royal octavo pages, at* ONE DOLLAR *per annum per copy;* SEVENTY-FIVE CENTS *per copy for Four and less than Ten copies; and* FIFTY CENTS *for Ten or more copies to the same Post Office. All subscriptions* IN ADVANCE.